Issued July 10, 1909.

U. S. DEPARTMENT OF AGRICULTURE,
FOREST SERVICE—Circular 166.
GIFFORD PINCHOT, Forester.

THE TIMBER SUPPLY OF THE UNITED STATES.

By
R. S. KELLOGG,
ASSISTANT FORESTER.

85874—Cir. 166—09——1 WASHINGTON : GOVERNMENT PRINTING OFFICE : 1909

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THE TIMBER SUPPLY OF THE UNITED STATES.

INTRODUCTION.

The object of this circular is to answer, so far as present knowledge permits, many questions which are constantly arising concerning the extent of our forest resources, their ownership, the rate at which they are being cut, and the outlook for a future timber supply. The data here given have been drawn from every available source. The bulk of them are based upon statistics collected by the Bureau of the Census, the Forest Service, and the Geological Survey, supplemented by reports of State foresters and conservation commissions, State and national.

The statistics of the cut and value of lumber and other forest products, except naval stores, are for the year 1907, because at this writing such statistics are not yet completed for 1908, and also because the 1908 figures in several instances, as the result of the business depression, are not as high as those for previous years, nor as high as they will be again with the return of better times.

The estimates of the original and present forest areas and stands are at best only approximate. They are offered tentatively, and any information which will make them more accurate will be gladly received. Great as is the need for it, there has never been a timber census of the United States, nor, with one or two exceptions, any close estimate of the forest resources of any individual State. Such a census must eventually be taken to furnish the basis for permanent forest conservation.

FOREST REGIONS.

ORIGINAL FORESTS.

The original forests of the United States exceeded in the quantity and variety of their timber the forests of any other region of similar size on the globe. There were five great forest types: the Northern, Southern, Central, Rocky Mountain, and Pacific Coast. Their boundaries are roughly sketched in figure 1.

The Northern forest ran from Maine through New England, across New York and most of Pennsylvania, through central and northern Michigan and Wisconsin to Minnesota, with an extension along the high Appalachian ridges as far southwestward as northern Georgia.

Roughly it covered 150 million acres. In this forest the cone-bearing trees predominated. It was the home of the white pine,

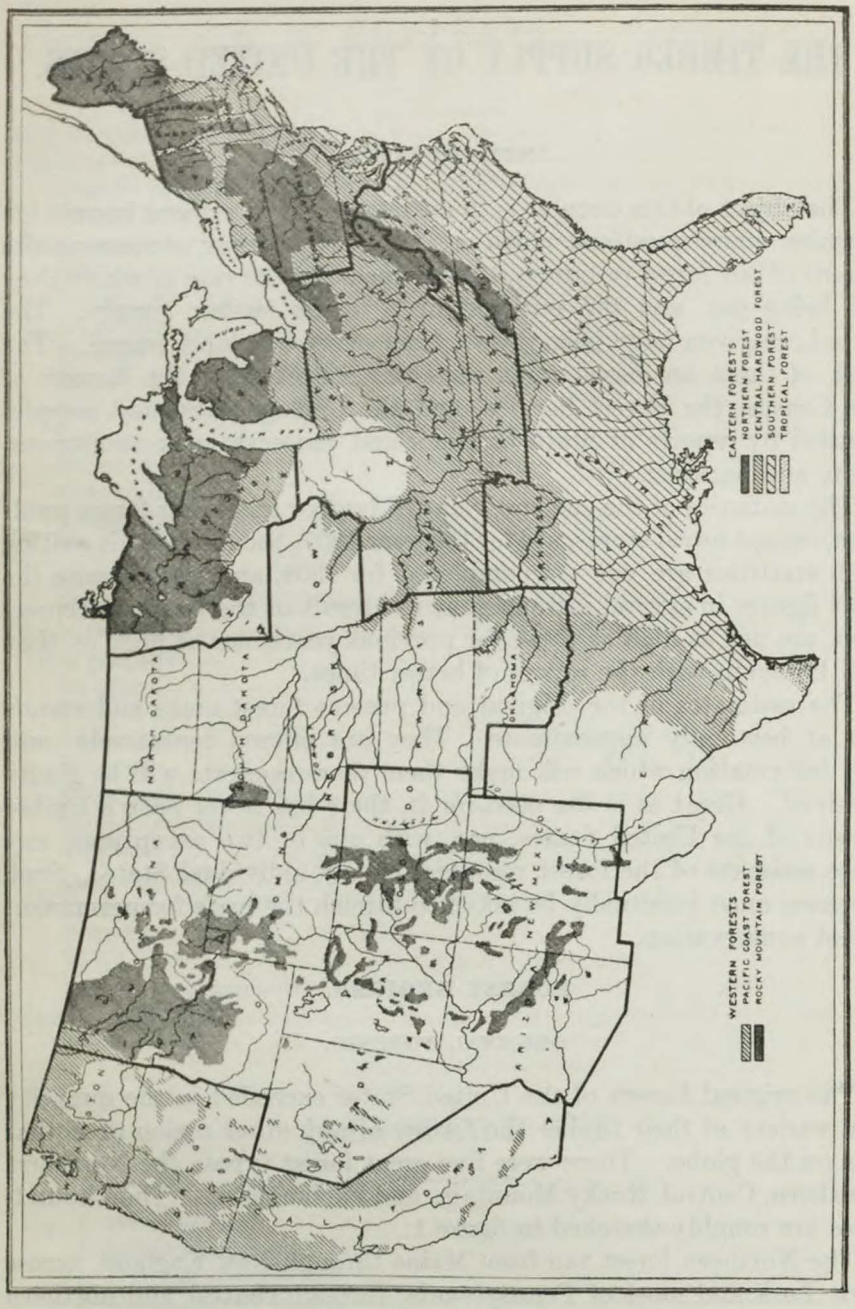

FIG. 1.—Forest regions of the United States.

and associated with that tree were red pine, spruce, hemlock, cedar, balsam fir, birch, cherry, sugar maple, and several other hardwoods

of minor importance. The total stand of timber of all kinds in the Northern forest was originally not less than 1,000 billion board feet.

The northern extremity of the Southern type was in southern New Jersey. From there the forest widened out southward and westward through Virginia, and covered nearly all of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, portions of eastern Texas and Oklahoma, and southern and western Arkansas, with a small extension into southern Missouri. This, too, was a coniferous forest. The yellow pines predominated heavily. Interspersed with the pines in localities suitable for their growth were cypress, oak, gum, magnolia, yellow poplar, and a variety of other hardwoods. The total original area of this forest was about 220 million acres, and it contained at least 1,000 billion feet of timber.

The Central forest stretched between the Northern and Southern types from the Atlantic Coast to the Plains. There were no sharp demarcations between it and the others, and it was extremely irregular in shape. It was the only forest region of the United States in which the hardwoods predominated, and they grew in extreme abundance. Walnut, oak, elm, hickory, cottonwood, maple, basswood, chestnut, sycamore, red gum, ash, and many other trees here reached their maximum development. It is conservatively estimated that the original area of the Central hardwood forest was not less than 280 million acres, and that the amount of timber standing in it before clearing began was at least 1,400 billion board feet.

The Rocky Mountain forest, as its name indicates, was typical of the Rocky Mountain region, from Idaho and Montana through Wyoming, Utah, and Colorado to Arizona and New Mexico. It was separated by the Plains from the eastern forests and by desert areas from the Pacific forest. This forest grew chiefly on the higher plateaus and mountain slopes and was almost entirely coniferous. Western yellow pine occurred throughout, while lodgepole pine, Douglas fir, larch, spruce, western red cedar, and other softwoods were abundant in many localities. The broken character of this forest makes an estimate of its area extremely difficult. It is probable, however, that the original extent was at least 110 million acres, with a stand of not less than 400 billion board feet of saw timber.

The Pacific type of forest prevailed in California, Oregon, and Washington, reaching its maximum development along the Sierras and west of the Cascades. So far as saw timber was concerned, it was almost exclusively a coniferous forest, and consisted chiefly of Douglas fir, western yellow pine, redwood, western red cedar, sugar pine, and various other firs and spruces. The original area of this forest was at least 90 million acres, and it contained not less than 1,400 billion board feet of timber.

It is safe then to estimate that the original forests of the United States covered 850 million acres and contained 5,200 billion board feet of saw timber according to present standards of utilization. In addition there were probably 100 million acres of scrubby forest and brush land, chiefly in the West, which has been and still is a source of much post and fuel material.

PRESENT FORESTS.

The original forests of the United States have been reduced by cutting, clearing, and fire from an acreage of 850 million to one of not more than 550 million, with a total stand of some 2,500 billion board feet. The Northern forest now contains perhaps 90 million acres and 300 billion feet of timber, or 60 per cent of its original area and 30 per cent of the original stand; the Southern forest, 150 million acres and 500 billion feet, or 68 per cent of its former area and 50 per cent of its stand; the Central forest, 130 million acres and 300 billion feet, or 46 per cent of the original area and 21 per cent of the stand; the Rocky Mountain forest, 100 million acres and 300 billion feet, or 91 per cent of the original area and 75 per cent of the stand; and the Pacific forest, 80 million acres and 1,100 billion feet, or 89 per cent of the original area and 79 per cent of the stand. The stand of timber in every region has been reduced in even greater proportion than has the actual forest acreage. This is particularly true in the Central States, where the hardwoods predominated. They occupied much rich agricultural land and were consequently cleared to make way for farms more than they were cut for lumber.

Table 1 brings together in comparative form the preceding estimates upon the original and present forest acreage and stand.

TABLE 1.—*Estimate of the area and stand of the original and present forests of the United States.*

Region.	Original forest.		Present forest.			
	Area.	Stand.	Area.	Stand.	Per cent of original area.	Per cent of original stand.
	Million acres.	*Billion feet.*	*Million acres.*	*Billion feet.*	*Per cent.*	*Per cent.*
Northern	150	1,000	90	300	60	30
Southern	220	1,000	150	500	68	50
Central	280	1,400	130	300	46	21
Rocky Mountain	110	400	100	300	91	75
Pacific	90	1,400	80	1,100	89	79
Total	850	5,200	550	2,500	65	48

Table 2 gives the total land area of each State and estimates of the original and present forest acreage. This table is only tentative and is submitted mainly for purposes of discussion and correction.

TABLE 2.—*Estimate of original and present forest areas, compared with total land area, by States.*

State.	Land area.	Original forest area.		Present forest area.	
		Extent.	Per cent of land area.	Extent.	Per cent of land area.
	Acres.	*Acres.*		*Acres.*	
Alabama	32,818,560	29,540,000	90	20,000,000	61
Arizona	72,857,600	14,570,000	20	14,000,000	19
Arkansas	33,616,000	31,940,000	95	24,200,000	72
California	99,898,880	29,970,000	30	24,000,000	24
Colorado	66,341,120	16,590,000	25	12,000,000	18
Connecticut	3,084,800	2,930,000	95	1,600,000	52
Delaware	1,257,600	1,130,000	90	350,000	28
Florida	35,111,040	29,840,000	85	20,000,000	57
Georgia	37,584,000	35,700,000	95	22,300,000	59
Idaho	53,618,560	24,130,000	45	20,000,000	37
Illinois	35,841,280	12,540,000	35	2,500,000	7
Indiana	22,966,400	19,520,000	85	4,000,000	17
Iowa	35,575,040	5,340,000	15	2,500,000	7
Kansas	52,335,360	1,570,000	3	1,000,000	2
Kentucky	25,715,840	23,140,000	90	10,000,000	39
Louisiana	29,061,760	26,160,000	90	16,500,000	57
Maine	19,132,800	18,180,000	95	14,900,000	78
Maryland	6,362,240	5,730,000	90	2,200,000	35
Massachusetts	5,144,960	4,630,000	90	2,000,000	39
Michigan	36,787,200	33,110,000	90	15,500,000	42
Minnesota	51,749,120	28,460,000	55	15,500,000	30
Mississippi	29,671,680	26,700,000	90	17,500,000	59
Missouri	43,985,280	26,390,000	60	18,300,000	42
Montana	93,296,640	23,320,000	25	18,000,000	19
Nebraska	49,157,120	1,470,000	3	800,000	2
Nevada	70,285,440	3,510,000	5	5,000,000	7
New Hampshire	5,779,840	5,490,000	95	3,500,000	61
New Jersey	4,808,960	4,330,000	90	2,000,000	42
New Mexico	78,401,920	15,680,000	20	12,000,000	15
New York	30,498,560	27,450,000	90	12,000,000	39
North Carolina	31,193,600	29,630,000	95	19,600,000	63
North Dakota	44,917,120	450,000	1	450,000	1
Ohio	26,073,600	23,470,000	90	4,800,000	18
Oklahoma	44,424,960	13,330,000	30	8,000,000	18
Oregon	61,188,480	30,590,000	50	27,000,000	44
Pennsylvania	28,692,480	27,260,000	95	9,200,000	32
Rhode Island	682,880	650,000	95	250,000	37
South Carolina	19,516,800	17,570,000	90	12,000,000	61
South Dakota	49,195,520	1,480,000	3	1,200,000	2
Tennessee	26,679,680	24,010,000	90	15,000,000	56
Texas	167,934,720	41,980,000	25	30,000,000	18
Utah	52,597,760	7,890,000	15	6,000,000	11
Vermont	5,839,360	5,550,000	95	2,500,000	43
Virginia	25,767,680	24,480,000	95	14,000,000	54
Washington	42,775,040	25,670,000	60	25,000,000	58
West Virginia	15,374,080	14,610,000	95	9,100,000	59
Wisconsin	35,363,840	26,520,000	75	16,000,000	45
Wyoming	62,460,160	12,490,000	20	10,000,000	16
Total	1,903,423,360	856,690,000	45	544,250,000	29

STUMPAGE ESTIMATES.

It is impossible with the data now at hand to make close estimates of the stumpage of the principal species, but Table 3 gives the best guesses that can be hazarded under the circumstances. In the table, the species are arranged in the order of total stands, while in the discussion that follows the order is that of present lumber production.

TABLE 3.—*Stumpage estimates.*

Species.	Billion board feet.	Species.	Billion board feet.
Douglas fir	525	Western spruce	60
Southern yellow pine	350	Eastern spruce	50
Western yellow pine	275	Western firs	50
Redwood	100	Sugar pine	30
Western hemlock	100	Cypress	20
Western cedar	100	Other conifers	100
Lodgepole pine	90	Hardwoods	500
White and Norway pine	75		
Eastern hemlock	75	Total	2,500

YELLOW PINE.

The total stand of yellow pine in the Southern States may be 350 billion feet. The cut in 1907 was about 13 billion feet. Many of the large operators say that they will cut out their supplies within the next fifteen years at the present rate of sawing. The center of yellow-pine production has moved westward rapidly in recent years. Georgia was the leading State in 1900, with nearly 12 per cent of the total output of yellow-pine lumber, while in 1907 it ranked ninth, with an absolute decrease in cut of nearly 500 million feet over 1900. In 1907 Louisiana ranked first, with nearly 18 per cent of the total; Texas second, with more than 16 per cent; and Mississippi third, with nearly 13 per cent.

DOUGLAS FIR.

The total stand of Douglas fir, the bulk of which is in Oregon and Washington, is probably not less than 525 billion feet. It is the principal timber tree of the Pacific coast, is abundant in Idaho and Montana, and occurs in some quantity throughout much of the Rocky Mountain region. The annual cut now is about 4¾ billion feet. The output of Douglas fir will increase rapidly in the near future if the market conditions are such as to encourage operations in the many large holdings of virgin timber in Oregon and Washington.

WHITE PINE.

The total stand of white pine and Norway pine in the Eastern and Lake States is perhaps 75 billion feet. The greatest white-pine pro-

duction in the Lake States was in 1890, when the output was over 8½ billion feet. With few exceptions the decrease has been steady since that time. The cut in 1907 was 2½ billion feet in the Lake States and 4,192,708,000 feet in all States, which included a small quantity of western white pine in Idaho, Montana, and Washington.

HEMLOCK.

It is very difficult to approach a correct estimate of the total stand of hemlock, because it grows so largely in mixture with other woods. An estimate of 100 billion feet of western hemlock and 75 billion feet of eastern hemlock seems to be reasonable. The annual cut at present is more than 3½ billion feet, chiefly from the eastern and northern States. Pennsylvania, Wisconsin, and Michigan supply more than two-thirds of the total. Western hemlock, principally in Washington and Oregon, contributes about 75 million feet.

SPRUCE.

The total spruce stumpage may be estimated at 50 billion feet in the East and North and 60 billion feet in the Rocky Mountain and Pacific regions. Several species of spruce enter into this estimate, of course. The output of spruce lumber has been slowly increasing for some time, and it is now about 1¾ billion feet yearly. Maine has always been far in the lead as a spruce-producing State, and more than 30 per cent of the spruce lumber is cut there. About one-sixth of the total cut is now supplied by the Rocky Mountain and Pacific Coast States, of which Washington furnishes much the larger proportion.

WESTERN PINE.

The total stand of western pine, including under this designation western yellow pine and lodgepole pine, may be estimated at 365 billion feet. Western yellow pine occurs throughout the Rockies and reaches its best development in California. The stumpage is about 275 billion feet. Lodgepole pine is most abundant in Colorado, Wyoming, Montana, and Idaho, with an estimated stumpage of 90 billion feet. The cut of western pine lumber is steadily increasing, and is now about 1½ billion feet annually. More than one-fourth of it is supplied by California and about one-sixth each by Idaho and Washington.

CYPRESS.

Much of the cypress is in Louisiana, though there are considerable quantities in Florida, Mississippi, Arkansas, and other Southern States. A very liberal estimate of cypress stumpage is 20 billion

feet. The annual lumber cut is about three-quarters of a billion feet, of which Louisiana supplies two-thirds. Nearly 1¼ billion cypress shingles are manufactured yearly, and also a considerable quantity of poles and ties.

REDWOOD.

The commercial supply of redwood is practically limited to a small strip of territory in California close to the coast, north of San Francisco. The estimated stand is 100 billion feet. The normal cut at the present time is approximately one-half billion feet of lumber and 700 million shingles.

WESTERN CEDAR.

All the Pacific coast and northern Rocky Mountain cedars are grouped under this head. The most important species are western red cedar, which occurs in greatest abundance in Washington, and incense cedar, of which there are heavy stands in California. The total western cedar stumpage is, perhaps, 100 billion feet. The annual cut is less than 200 million feet of lumber and about 7 billion shingles. Most of the lumber and practically all of the shingles are of red cedar.

WESTERN FIRS.

This term is used to cover alpine fir in the Rocky Mountains, white fir in the Rockies and on the Pacific coast, and noble and other Pacific coast firs. The total stumpage of these species is very difficult to estimate. It may amount to 50 billion feet. So far these firs have been little used for lumber. Nearly 150 million feet of white fir was cut in 1907, more than half being supplied by California and most of the remainder by Montana and Idaho.

SUGAR PINE.

The total stand of sugar pine may be 30 billion feet. Nearly all of it is in the California Sierras. The annual cut is slightly more than 100 million feet.

OTHER CONIFERS.

Other less important softwoods, for which sufficient data for individual estimates of stand are lacking, are eastern cedar, western larch, eastern tamarack, balsam fir, western white pine, and several other western pines. The total stand of these woods may be in the neighborhood of 100 billion feet. The annual cut is less than 400 million feet. Larch and western white pine are cut chiefly in Montana and Idaho, tamarack in the Lake States, and balsam fir in Maine.

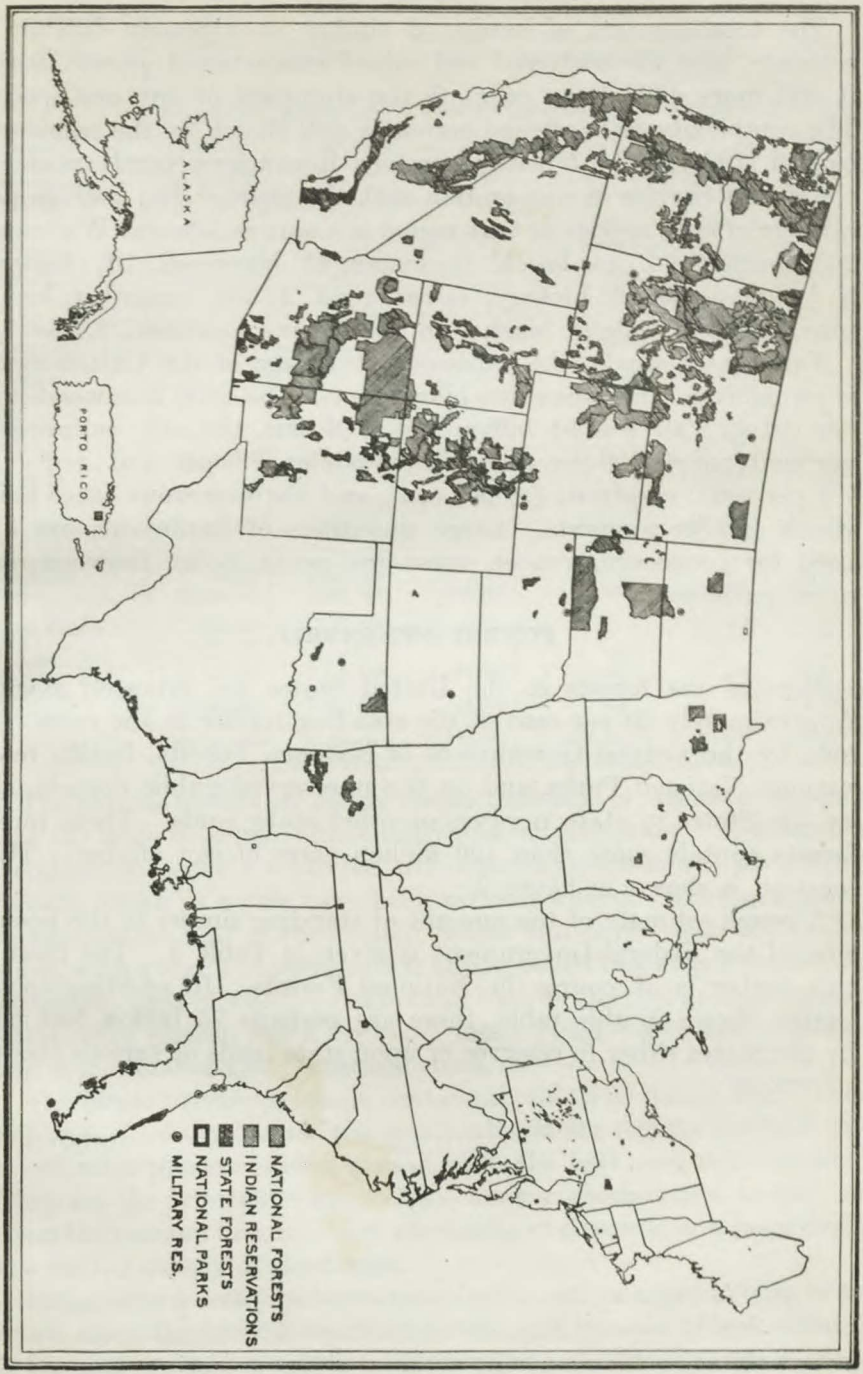

FIG. 2.—Public forest lands. Forests in the unreserved public domain and unreserved state forest lands are not shown.

HARDWOODS.

The total amount of hardwood timber is extremely difficult to estimate, and the scattered and mixed character of growth makes it still more difficult to estimate the stumpage of any one species. The complexity of hardwood stands is well shown by the result of a careful study of the forests of eastern Kentucky recently made by the Forest Service in cooperation with the State. The average percentage of each species in that region is about as follows: White oak, 20; chestnut oak, 18; beech, 15; maple, 13; black oak, 10; chestnut, 6; yellow poplar, 6; hickory, 4; basswood, 2; ash, cucumber, locust, pine, hemlock, walnut, black gum, and cherry combined, 6.

Taken as a whole, the hardwood stumpage of the United States is probably not less than 500 billion feet. The total hardwood lumber cut in 1907 was 9¼ billion feet. Of this, the oaks supplied 40 per cent; maple, 10 per cent; yellow poplar, 7.9 per cent; red gum, 7.5 per cent; chestnut, 7.1 per cent, and the numerous other hardwoods smaller amounts. Large quantities of hardwoods are also used for cooperage, veneer, cross-ties, posts, poles, firewood, and other purposes.

FOREST OWNERSHIP.

Most of the forests in the United States are privately owned. Approximately 20 per cent of the standing timber in the country is held by the Federal Government in National Forests, Indian reservations, National Parks, and on the unreserved public domain, and by the States in state reserves or other state lands. These public forests contain more than 100 million acres of saw timber. Their location is shown in figure 2.

A rough estimate of the amount of standing timber in the possession of the Federal Government is given in Table 4. The most of this timber is of course in National Forests. In addition to the timber shown in this table, there are perhaps 75 billion feet held by the States either in reserves or upon state lands of various classes.

TABLE 4.—*Estimated amount of standing saw timber controlled by the Federal Government.*

State.	National Forests.	Indian reservations.	National Parks.	Military reservations.	Unreserved public lands.	Total.
	M board feet.	*M board feet.*	*M board feet.*	*M board feet.*	*M board feet.*	*M board feet.*
Alabama				1,500	50,000	51,500
Arizona	6,500,000	5,000,000		50,000		11,550,000
Arkansas	1,800,000				634,000	2,434,000
California	94,800,000	3,500,000	8,000,000		3,216,000	109,516,000
Colorado	12,200,000				1,200,000	13,400,000
Florida				8,400	80,000	88,400
Georgia				4,100		4,100
Idaho	34,600,000	2,000,000			2,000,000	38,600,000
Indiana				75		75
Kansas				4,640		4,640
Louisiana					55,000	55,000
Maine				220		220
Maryland				510		510
Michigan					36,000	36,000
Minnesota		3,200,000			500,000	3,700,000
Mississippi					21,000	21,000
Missouri					13,000	13,000
Montana	35,900,000	2,400,000		12,000	1,200,000	39,512,000
Nebraska					10,000	10,000
Nevada	75,000				100,000	175,000
New Mexico	11,200,000	1,700,000		40,000	800,000	13,740,000
New York				570		570
North Carolina				30		30
Oklahoma	18,000	4,000,000				4,018,000
Oregon	90,075,000	3,900,000	562,000	600	2,500,000	97,037,600
South Dakota	2,256,000	75,000			443,000	2,774,000
Utah	5,940,000	14,000			300,000	6,254,000
Virginia				50		50
Washington	89,954,000	6,100,000	1,475,000	75,000	672,000	98,276,000
Wisconsin		2,000,000			8,000	2,008,000
Wyoming	4,700,000	200,000	680,000	900		5,580,900
Total	390,018,000	34,089,000	10,717,000	198,595	13,838,000	448,860,595

The private forests are of two distinct classes, (1) farmers' woodlots and (2) large holdings, either individual or corporate. The farmers' woodlots are chiefly scattered and detached remnants of the original forests, which as a rule have been severely culled. They are mainly in the eastern half of the United States and cover some 200 million acres, with a stand of perhaps 300 billion board feet of saw timber and 1½ billion cords of wood. Aside from their protective and ornamental value, they furnish much firewood, many posts, poles, and cross-ties, and some lumber and cooperage stock.

The larger private holdings contain about 1,700 billion feet. These holdings generally include the best timber in the regions in which they occur, since private capital always seeks the best possible investment. They are the principal sources of the lumber which is used to-day, and upon the manner in which they are managed depends in a large degree the timber supply of the future.

So far, true forestry has been practiced to only a slight extent, or not at all, upon the forests in private hands, and, because of lack of funds, it has not yet been possible to apply right methods of forest management to all public forests, though such methods will eventually be used in handling them.

FOREST PRODUCTS.

The value of the forest products of the United States in 1907, the last year for which detailed data are available, was appproximately $1,280,000,000. The principal items are shown below. The value in every case is stated in round numbers, and is estimated at the point of production.

Lumber, shingles, and lath	$750,000,000
Firewood	250,000,000
Poles, posts, and rails	100,000,000
Hewed cross-ties	60,000,000
Cooperage stock	35,000,000
Naval stores	30,000,000
Pulpwood	20,000,000
Tanbark and extracts	15,000,000
Round mine timbers	10,000,000
Miscellaneous	10,000,000
Total	1,280,000,000

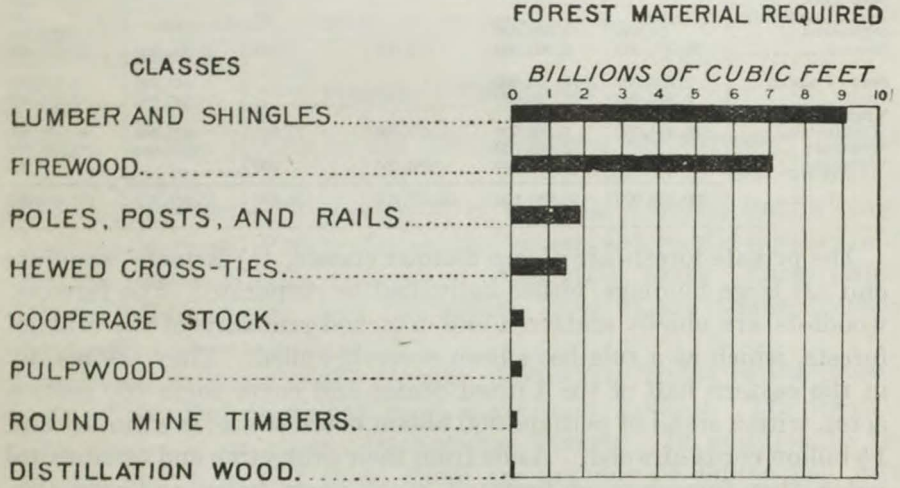

FIG. 3.—Forest products in 1907.

Nearly three-fifths of the total value of our forest products is made up of lumber, shingles, and lath, and a little less than one-fifth of firewood. No other group of products contributes as much as 10 per cent of the total value.

The quantity of forest material required for these products under present conditions of logging and manufacturing is shown graphically in figure 3. The total exceeds 20 billion cubic feet. Of this, lumber and shingles take a little more than two-fifths; firewood, one-third; posts, poles, and rails, about one-twelfth; and hewed cross-ties, about one-sixteenth; relatively small quantities are required for the other products.

The cut of lumber, by kinds, in 1907 is shown graphically in figure 4, the total being 40,256,000,000 board feet. Yellow pine was in the lead with 32.8 per cent of the total; Douglas fir ranked second, with 11.8 per cent; white pine third, with 10.4 per cent; oak fourth, with 9.2 per cent; and hemlock fifth, with 8.4 per cent. Spruce and west-

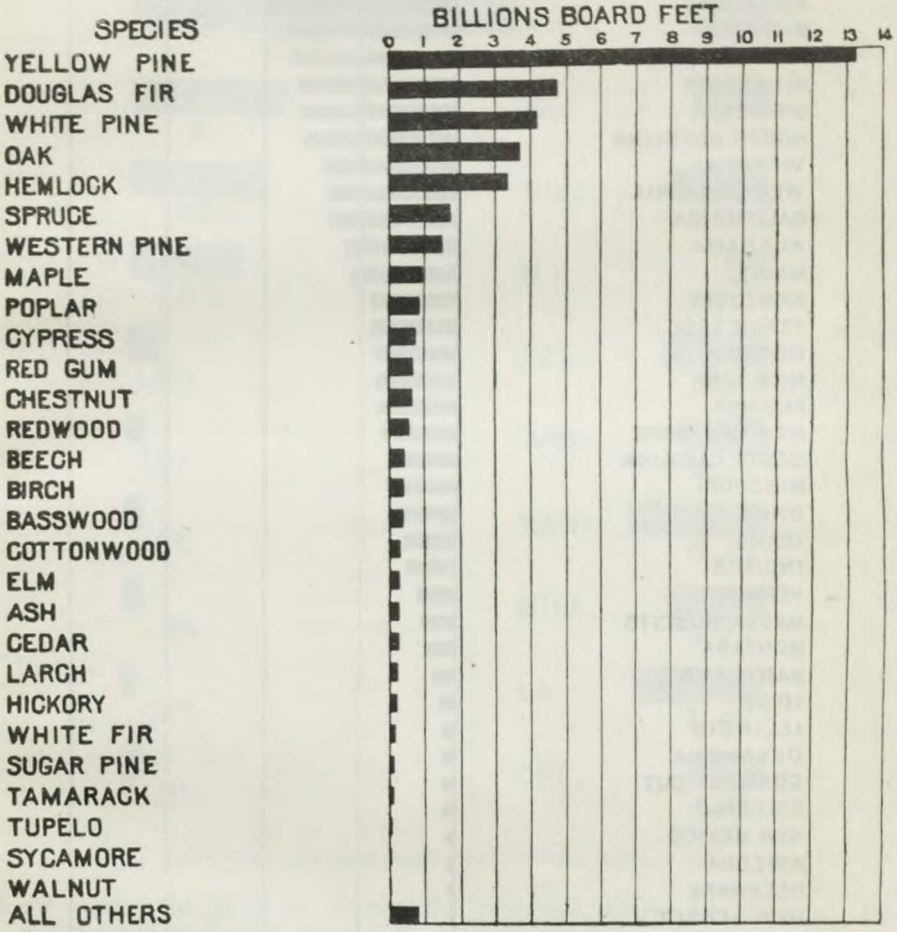

FIG. 4.—Lumber cut by species, 1907.

ern pine furnished 4.3 and 3.8 per cent, respectively. These seven are the only woods which annually produce more than a billion feet of lumber each, and, taken together, they furnish more than four-fifths of our annual lumber supply.

The softwoods as a group supplied 77 per cent of the lumber cut in 1907, and the hardwoods 23 per cent. The softwood cut, therefore, was nearly 3½ times as great as the hardwood cut. In 1900

the hardwoods supplied nearly 25 per cent of the total. The increase of more than 14 per cent in the total lumber production from 1900

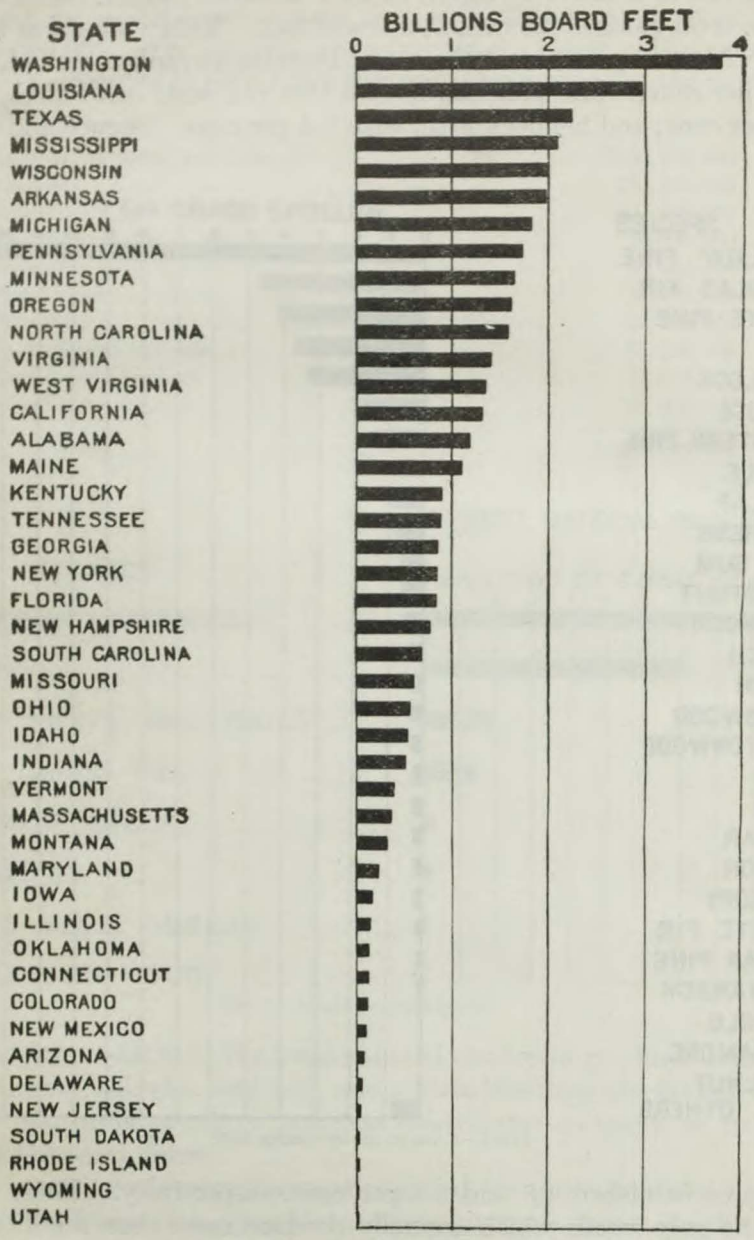

FIG. 5.—Lumber cut by States, 1907.

to 1907 was due chiefly to very heavy increases in some of the soft-woods. During the seven years the output of yellow pine increased approximately 37 per cent, that of western pine 62 per cent, that of

cypress 53 per cent, that of redwood 58 per cent, and that of Douglas fir 173 per cent. These increases far more than counterbalanced the decrease of nearly 46 per cent in white pine. On the other hand, the cut of the two leading hardwoods, oak and yellow poplar, decreased 16 per cent and 22 per cent, respectively, during this period. Remarkable increases took place in the output of some of the minor

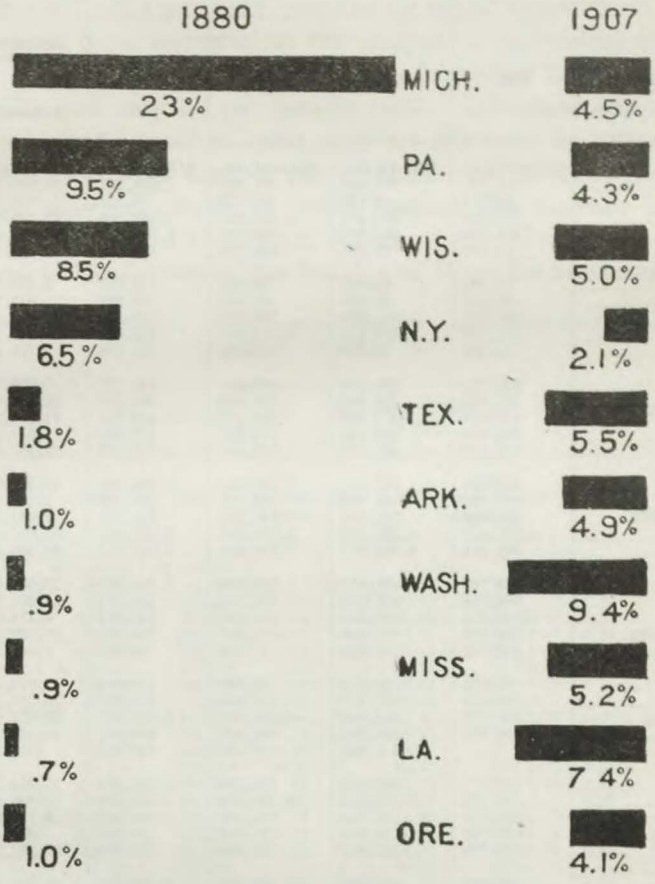

FIG. 6.—Relative lumber production of ten States, 1880 and 1907.

hardwoods; the gain in maple, for instance, being 48 per cent, in red gum 142 per cent, and in chestnut 216 per cent.

The lumber cut by States in 1907 is shown in figure 5. Washington, which ranked first, supplied 9.4 per cent of the total; Louisiana came second, with 7.4 per cent; Texas third, with 5.5 per cent; Mississippi fourth, with 5.2 per cent; and Wisconsin fifth, with 5 per cent. These five States are the only ones which cut 2 billion or more feet of lumber in 1907, and, taken together, they furnished nearly one-third of the total production.

Table 5 gives the lumber production of the United States by States in 1880, 1890, 1900, and 1907, together with an estimate of the total cut from 1880 to 1907 and the percentage supplied by each State. The cut in each of the four years specified is taken from Census bulletins.

TABLE 5.—*Lumber production of the United States, by States: 1880–1907.*

State.	1880.	1890.	1900.	1907.	Estimated total cut, 1880–1907.	
					Amount.	Per cent.
	M board feet.	*M board feet.*	*M board feet.*	*M board feet.*	*M board feet.*	
Alabama	251,851	589,480	1,101,386	1,224,967	20,803,221	2.7
Arizona	10,715	5,320	36,182	72,134	666,791	.1
Arkansas	172,503	537,884	1,623,987	1,988,504	27,005,009	3.5
California	304,795	517,781	737,035	1,345,943	17,677,383	2.3
Colorado	63,792	79,951	133,746	134,239	2,725,148	.4
Connecticut	64,460	48,957	108,093	140,011	2,220,699	.3
Delaware	31,572	23,466	35,955	50,892	876,260	.1
Florida	247,627	411,869	790,373	839,058	15,011,699	1.9
Georgia	451,792	575,152	1,311,917	853,697	22,149,714	2.9
Idaho	18,204	27,800	65,363	513,788	2,722,864	.3
Illinois	334,274	221,810	388,469	141,317	7,686,066	1.0
Indiana	917,900	755,407	1,036,999	504,790	22,724,827	3.0
Iowa	412,578	571,166	352,411	144,271	11,274,992	1.5
Kentucky	306,067	423,185	774,651	912,908	15,541,897	2.0
Louisiana	133,472	303,726	1,115,366	2,972,119	23,587,648	3.1
Maine	580,082	597,481	784,647	1,103,808	19,408,048	2.5
Maryland	127,336	82,119	183,711	213,786	3,767,665	.5
Massachusetts	205,816	211,588	344,190	364,231	7,345,384	1.0
Michigan	4,178,610	4,300,172	3,018,338	1,827,685	95,947,541	12.5
Minnesota	563,974	1,084,377	2,342,338	1,660,716	39,386,019	5.1
Mississippi	168,747	454,417	1,206,265	2,094,485	22,971,855	3.0
Missouri	399,744	402,052	723,754	548,774	14,091,858	1.8
Montana	21,420	89,511	255,685	343,814	4,378,882	.6
New Hampshire	295,339	277,063	572,447	754,023	11,752,205	1.5
New Jersey	110,562	34,052	74,118	39,942	1,663,130	.2
New Mexico	11,195	26,112	30,880	113,204	975,789	.1
New York	1,185,223	925,417	878,448	848,894	25,618,222	3.3
North Carolina	243,075	514,692	1,286,638	1,622,387	22,977,073	3.0
Ohio	910,857	565,315	990,497	529,087	20,478,464	2.7
Oklahoma	.....	2,552	22,104	140,015	703,457	.1
Oregon	177,171	446,483	734,538	1,635,563	17,318,724	2.3
Pennsylvania	1,734,170	2,133,316	2,333,278	1,734,729	55,908,425	7.3
South Carolina	185,772	198,764	466,429	649,058	9,152,850	1.2
South Dakota	[a] 29,286	[a] 28,233	[a] 33,734	34,841	837,443	.1
Tennessee	302,679	460,261	950,958	894,968	17,331,536	2.3
Texas	328,968	842,648	1,232,404	2,229,590	28,350,319	3.7
Vermont	323,357	384,476	375,809	373,660	9,963,732	1.3
Virginia	316,739	415,512	959,119	1,412,477	18,834,996	2.4
Washington	160,176	1,063,584	1,429,032	3,777,606	36,805,113	4.8
West Virginia	180,112	301,958	778,051	1,395,979	15,419,500	2.0
Wisconsin	1,542,021	2,866,153	3,389,166	2,003,279	72,191,023	9.4
All others [b]	121,399	40,968	59,084	70,915	1,852,092	.2
Total	18,125,432	23,842,230	35,067,595	40,256,154	768,105,563	100.0

[a] Includes small quantity in North Dakota.
[b] Includes Kansas, Nebraska, Nevada, Rhode Island, and Utah.

Some striking things are shown by this table. Since 1880, for instance, Michigan has produced nearly 96 billion feet of lumber, or one-eighth of the entire cut of the United States Wisconsin has furnished more than 72 billion feet, and Pennsylvania nearly 56

billion feet. The cut of all these States is now decreasing, though the falling off has been most striking in Michigan, where the output in 1907 was less than 2 billion feet, the smallest in nearly forty years.

The changes which have taken place in the relative lumber production of ten of the leading States are brought out graphically in figure 6. In 1880 these States furnished 53.8 per cent of the total cut, and in 1907, 52.4 per cent, practically equal proportions; but the changes which have occurred in the output of individual States are most significant. Michigan, for example, furnished 23 per cent of the total in 1880, and only 4.5 per cent in 1907. Louisiana supplied only 0.7 per cent of the total in 1880, and 7.4 per cent in 1907. Washington cut only 0.9 per cent of the total in 1880, and 9.4 per cent in 1907. This diagram shows in vivid fashion the manner in which, with the cutting out of the virgin timber in the North and East, we have turned to the forests of the South and West for our lumber.

TABLE 6.—*Lumber production, lumber prices, and stumpage prices in the United States, by species, 1900 and 1907.*

Species.	Lumber cut.			Mill price of lumber, M feet.			Stumpage price, M feet.			Stumpage price in per cent of mill price in 1907.
	1900.	1907.	Per cent increase.	1900.	1907.	Per cent increase.	1900.	1907.	Per cent increase.	
	M board ft.	*M board ft.*								
Walnut	38,681	41,490	7	$36.49	$43.31	19	.....	.....	.....	.....
Hickory	96,636	203,211	110	18.78	29.50	57	.....	$6.69	.....	23
Ash	269,120	252,040	[a] 6	15.84	25.01	58	$3.03	7.58	150	30
Yellow poplar	1,115,242	865,536	[a] 22	14.03	24.91	78	2.81	4.64	65	19
Cypress	495,836	757,639	53	13.32	22.12	66	1.58	4.37	177	20
Oak	4,438,027	3,718,760	[a] 16	13.78	21.23	54	[b]3.18	6.52	105	31
Basswood	308,069	381,088	24	12.84	20.03	56	1.50	6.79	353	34
Sugar pine	53,558	115,005	115	12.30	19.84	61	.....	.....	.....	.....
White pine	7,742,391	4,193,787	[a] 46	12.69	19.41	53	3.66	8.09	121	42
Cedar	232,978	251,002	8	10.91	19.14	75	1.32	4.63	251	24
Elm	456,731	260,579	[a] 43	11.47	18.45	61	3.30	4.94	50	27
Cottonwood	415,124	290,574	[a] 30	10.37	18.42	78	1.45	3.97	174	22
Redwood	360,167	569,450	58	10.12	17.70	75	1.06	2.35	122	13
Birch	132,601	387,614	192	12.50	17.37	39	.....	4.40	.....	25
Spruce	1,448,091	1,726,797	19	11.27	17.26	53	2.26	[c]5.49	143	32
Chestnut	206,688	653,239	216	13.37	17.04	27	2.71	4.97	83	29
Maple	633,466	939,073	48	11.83	16.84	42	2.66	2.50	[a d] 6	15
Tamarack	8,225	113,433	.....	8.73	15.71	80	.....	.....	.....	.....
Western pine	944,185	1,526,116	62	9.70	15.67	62	.....	1.66	.....	11
Hemlock	3,420,673	3,373,016	[a] 1	9.98	15.53	56	2.56	[e]4.51	76	29
White fir	.....	146,508	.....	.....	15.45	.....	.....	.....	.....	.....
Tupelo	.....	68,842	.....	.....	14.48	.....	.....	1.27	.....	9
Beech	.....	430,005	.....	.....	14.30	.....	.....	3.56	.....	25
Douglas fir	1,736,507	4,748,872	173	8.67	14.12	63	.77	1.44	87	10
Red gum	285,417	689,200	141	9.63	14.10	46	1.68	2.46	46	17
Yellow pine	9,658,923	13,215,185	37	8.51	14.02	65	1.12	3.16	182	23
Larch	42,394	211,076	398	8.00	13.07	63	.....	.....	.....	.....

Average mill price of all lumber in 1900	$11.10
Average mill price of all lumber in 1907	16.53
Average price of all stumpage in 1900	2.13
Average price of all stumpage in 1907	4.12
Stumpage price in per cent of mill price, 1907, all species	25

[a] Decrease.
[b] White oak.
[c] Eastern spruce.
[d] There was evidently some mistake in the calculation of the average value of maple stumpage in 1900 or in 1907, since there is no reason to think that a decrease actually occurred.
[e] Eastern hemlock.

Table 6 presents an instructive comparison of the total cut of each species in 1900 and in 1907, the average value of the lumber at the mill, the average stumpage price in each year, and the ratio of stumpage to lumber prices in 1907. The order is that of the value of the lumber per thousand feet in 1907. The percentage increase has been much greater in stumpage prices than in lumber prices, but, on the other hand, the actual increase in lumber prices has been greater than that in stumpage prices.

SHINGLES.

Many woods are used to some extent for shingles, but the market is dominated by cedar shingles, of which there are two kinds, the white cedar, or arbor vitæ of the Northeastern and Lake States, and the western red cedar, or giant arbor vitæ of the Pacific coast. Of the production of 11,824,475,000 shingles in 1907, the western cedar supplied over three-fifths, and the eastern cedar about one-tenth. Ten per cent of the shingles were of cypress, and 7 per cent and 5 per cent, respectively, of redwood and yellow pine. Much more cedar is used for shingles than for other purposes, while with other woods shingles are frequently a by-product of lumber manufacturing.

LATH.

Lath are usually a by-product of lumber manufacturing, and so do not of themselves constitute an additional drain upon the forests. While some lath are made from nearly every wood that is cut into lumber, most of the 3,663,000,000 lath manufactured in 1907 were of white pine, yellow pine, hemlock, Douglas fir, spruce, and cypress.

FIREWOOD.

It is estimated that approximately 75 million cords of wood, exclusive of mill waste, are consumed annually for fuel in the United States, most of it, of course, for domestic purposes upon farms in the regions where wood is relatively abundant and cheap and coal difficult to obtain or high in price. A great deal of wood is burned everywhere, except on the Great Plains, where, since there is almost no timber at all, such a use is impossible. Much of the firewood is cut from farmers' woodlots, and has little value for other purposes. On the other hand, good hardwood timber which could be used for lumber or other purposes is often cut into firewood.

POLES, POSTS, AND RAILS.

Some 3½ million round poles exceeding 20 feet in length are used annually by telegraph, telephone, and other electric companies. Over

three-fifths of these poles are cedar, and more than one-fourth of them chestnut. Relatively small amounts of pine, cypress, and redwood poles are also used.

Perhaps 1 billion fence posts and rails are used annually upon the farms and ranches in the United States. The data so far collected upon this subject are very unsatisfactory. While the cedar posts of the Lake States are shipped long distances, most of the posts and practically all of the fence rails are cut in the locality where they are used, and consequently the kind of timber which is used for these purposes varies greatly, the effort always being, of course, to cut the kind that is the most durable. Wherever it grows, chestnut is a favorite wood for both posts and rails. Many posts are made from young, round timber. Rails are generally made from straight timber, of larger size, which splits well, and many posts are also split.

HEWED CROSS-TIES.

The steam and electric railway companies of the United States purchased some 153 million cross-ties in 1907, more than three-fourths of which were hewed. Since sawed cross-ties are classed as lumber, they are not discussed here. The oaks, and chiefly the white oaks, supply more than 45 per cent of the hewed ties. The making of hewed ties from young oak trees is, with the exception of lumber, the heaviest drain upon our oak forests. More than 22 per cent of the hewed cross-ties were supplied by the southern pines, about 7 per cent by cedar, and about 5 per cent by chestnut. Spruce, tamarack, western hemlock, and redwood are used in lesser quantities.

PULPWOOD.

More than 3 million cords of domestic pulpwood were used in 1907, and, in addition, some 925,000 cords were imported from Canada. Of the domestic pulpwood, nearly three-fifths was spruce and almost one-fifth hemlock. Most of the remainder was poplar, with small quantities of several other woods. Nearly as much spruce is used for pulp as for lumber.

COOPERAGE STOCK.

Cooperage stock is of two distinct classes, tight and slack. While the production of the former is much less in quantity, it requires much higher-grade timber. In 1907 there were manufactured 385,232,000 tight staves and 27,692,994 sets of tight heading. The slack cooperage output amounted to 1,175,977,000 staves, 106,074,000 sets of heading, and 490,570,000 hoops. Probably 90 per cent of the tight cooperage stock required the best quality of white oak for its production. A large number of woods are used for slack staves

and heading, the most important being red gum, pine, elm, beech, and maple. Because of its strength and toughness elm is almost the only wood used for hoops, and probably as much of this wood is used for staves and hoops as for lumber.

TANBARK AND EXTRACTS.

The tanneries of the United States in 1907 used nearly 1,200,000 cords of hemlock and oak bark and more than 400,000 barrels of tanning extracts made from domestic bark and wood. Two-thirds of the bark was hemlock, and the rest oak. Two-thirds of the extract was made from chestnut wood, and most of the remainder from hemlock and oak bark. Nearly 130,000 cords of hemlock and oak bark were also used in making extract. The manufacture of tanning extract from chestnut wood has increased rapidly in recent years, and at least 250,000 cords of that wood were used for that purpose in 1907. In the earlier days of the tanning industry a great deal of hemlock was cut solely for its bark and the wood was left to rot in the woods. This was also true, to a lesser extent, of oak. These practices are not general at the present time, however.

As the domestic supply has diminished there have been marked increases in the importation of tanning materials, the most striking being that of the wood and extract of quebracho, a South American tree. More than 290,000 barrels of quebracho extract were used by the tanneries of the United States in 1907.

ROUND MINE TIMBERS.

Statistics collected by the Forest Service and the Geological Survey in 1905 show that the annual consumption of round mine timbers exceeds 165 million cubic feet, and that hardwoods constitute more than half the total. Like the making of hewed cross-ties, the cutting of round mine timbers takes large quantities of young timber, and in many localities constitutes a serious drain upon the forests.

NAVAL STORES.

The production of naval stores in 1908, according to data recently gathered by the Forest Service, exceeded 36 million gallons of turpentine and 4 million barrels of rosin, of which Florida and Georgia supplied two-thirds. About one-half of the product is exported.

While the production of naval stores does not necessarily destroy the forests, the methods so far used in the majority of the turpentining operations, coupled with subsequent fires and windstorms, have resulted in the destruction of a great deal of saw timber.

MISCELLANEOUS PRODUCTS.

Under this heading are included such forest products as maple sugar and sirup, timber which is exported in the log, and wood used for distillation, the annual value of which, all together, is easily $10,000,000. More than 1,280,000 cords of wood were used for distillation in 1907. With the exception of about 60,000 cords of pine, this wood consisted of hardwoods, chiefly birch, beech, and maple. No detailed information is available upon either the kind or quantity of logs exported, though the reports of the Bureau of Statistics, Department of Commerce and Labor, show their value to be more than $3,000,000. Probably more walnut than any other timber is exported in this form.

THE FUTURE SUPPLY.

As is shown in the preceding pages, the total yearly drain upon our forests, not counting losses from fire, storms, and insects, is some 20 billion cubic feet. Our present forest area of 550 million acres may be roughly estimated to consist of 200 million acres of mature forests, in which the annual growth is balanced by death and decay, of 250 million acres partially cut or burned over, on which, with reasonable care, there is sufficient young growth to produce in the course of time a merchantable, but not a full crop of timber, and 100 million acres of more severely cut and burned over forests, on which there is not sufficient young growth to produce another crop of much value.

Taken as a whole, the annual growth of our forests under these conditions does not exceed 12 cubic feet per acre, a total of less than 7 billion cubic feet. That is, we are cutting our forests three times as fast as they are growing. There is menace in the continuance of such conditions. While we might never reach absolute timber exhaustion, the unrestricted exploitation of our forests in the past has already had serious effects, and it will have much worse if it is allowed to continue unchecked. White pine, for instance, which was once considered inexhaustible, has fallen off 70 per cent in cut since 1890, and more than 45 per cent since 1900. The cut of oak, our most valuable hardwood lumber, has decreased 16 per cent since 1900, and that of yellow poplar 22 per cent. The same story will be told of other woods if they are not conserved.

The fact that timber has been cheap and abundant has made us careless of its production and reckless in its use. We take 250 cubic feet of wood per capita annually from our forests, while Germany uses only 37 cubic feet, and France but 25. On the other hand,

Germany, who has learned her lesson, makes her state forests produce an average of 48 cubic feet of wood per acre. We have as fast-growing species as Germany, or faster, and as good or better forest soil if we protect it.

The necessity for more farm land may eventually reduce our total forest area to 100 million acres less than it is at present. It is entirely possible, however, to produce on 450 million acres as much wood as a population much greater than we have now will really need if all the forest land is brought to its highest producing capacity and if the product is economically and completely utilized. But to reach the necessary condition of equilibrium between timber production and consumption will take many years of vigorous effort by individual forest owners, by the States, and by the National Government. None of them can solve the problem alone; all must work together.

Approved:

JAMES WILSON, *Secretary of Agriculture.*

WASHINGTON, D. C., *May 10, 1909.*

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